

Question Number	Answer	Acceptable answers	Mark
1(a)	A differentiate into any type of cell		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)	<p>Any two structures from the list with at least one matched adaptation:</p> <p>Structures (maximum of 2)</p> <ul style="list-style-type: none"> • biconcave shape (1) • no nucleus (1) • thin membrane (1) • flexible / small (1) • contains haemoglobin (1) <p>(matched) adaptation (maximum of 2)</p> <ul style="list-style-type: none"> • large surface area / increase oxygen uptake (1) • to increase amount of haemoglobin / oxygen-carrying capacity (1) • so short distance for diffusion (1) • to get through capillaries (1) • to bind oxygen (1) 		(3)

Question Number	Answer	Acceptable answers	Mark
1(c)	<p>A description including two of the following points</p> <ul style="list-style-type: none"> • clotting / to seal a wound / scab formed (1) • stop bleeding (1) • prevent infection / entry of microbes (1) • fibrin (1) 		(2)

Question Number		Indicative Content	Mark
QWC	1(d)	<p>A comparison between mitosis and meiosis including</p> <p>Mitosis</p> <ul style="list-style-type: none"> • (genetically) identical cells produced • two daughter cells • one division • diploid daughter cells • identical set of chromosomes • occurs in the formation of body cells • for growth and repair (of body tissues) <p>Meiosis</p> <ul style="list-style-type: none"> • (genetically) non-identical cells • four daughter cells • 2 divisions • haploid daughter cells • half the number of chromosomes • occurs in the formation of gametes • for sexual reproduction • results in genetic variation 	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited description including two points on either meiosis or mitosis there maybe confusion between the two but this does not negate the level • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy 	
2	3 - 4	<ul style="list-style-type: none"> • a simple description including one comparison of meiosis and mitosis or a detailed description of either mitosis or meiosis • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy 	
3	5 - 6	<ul style="list-style-type: none"> • a detailed comparison of both meiosis and mitosis – at least two correct comparisons made • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors 	

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	0.5 / 0.5 picogram	Accept: 0.5 picograms accept: the same (mass) as the sperm cell	(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	C haploid		(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	thymine with adenine, cytosine with guanine		(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(iv)	weak hydrogen bonds / hydrogen bonds / hydrogen (1)	H (bond)	(1)

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	A description including three of the following points: <ul style="list-style-type: none"> • cell divides / cell division / cell splits(1) • two cells produced (1) • (both) diploid (1) • (both) cells are <u>genetically</u> identical (1) 	credit correct reference to stages of mitosis: DNA replication / chromosomes duplicate (1) Chromosomes line up along the equator / middle of the cell (1) chromosomes pulled to either end of cell (1) cytokinesis / cytoplasm splits (1)	(3)

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	<p>A description including three of the following points:</p> <ul style="list-style-type: none"> • ref (to many) cell divisions / eq (1) • growth (1) • ref to differentiation / specialisation (1) • ref to stem cells (1) 	<p>accept: gets bigger / larger</p> <p>accept: become specific cells</p>	(3)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	Correct substitution i.e. $(-0.5 \div 10.3) \times 100$ (1) - 4.85 / - 4.9	Accept data correctly put into other acceptable methods. Accept answer with more decimal places eg: - 4.8543 / - 4.854368932 Full marks for correct bald answer award max of one mark if negative is not written eg 4.85 / 4.9	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	better / easier / more valid comparison can be made between values / can make more valid conclusion / because the original / starting masses of potato were not the same / Idea of easier to visualise the size of the change	Ignore makes the results / test reliable / accurate	(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	<p>A description including the following:</p> <ul style="list-style-type: none"> • Produce two (daughter) cells • which are genetically identical • and diploid 	<p>Accept DNA for chromosomes throughout</p> <p>Also credit details of the process of mitosis</p> <p>chromosomes replicates (1)</p> <p>spindle fibres form / chromosomes attached to spindle (1)</p> <p>Chromosomes arranged on equator / middle of cell / chromosomes pulled apart /pulled to poles /separation of sets of chromosomes (1)</p> <p>Idea of nucleus reforming / New cell wall formed (to divide cell) / cytokinesis / description of cytokinesis (1)</p>	(3)

Question Number	Indicative Content	Mark
QWC *3(c)	<p>A explanation to include some of the following points</p> <ul style="list-style-type: none"> • active transport requires energy • (active transport moves mineral ions) from the soil into root (hair cells) • reference to pumps (in the cell membranes) • from a low concentration to a high concentration/against their concentration gradient • reference to mineral ions / mineral salts accept named minerals eg nitrates • diffusion is a passive process • gases diffuse from high to low concentration/down their concentration gradient • gas exchange in the leaf occurs by diffusion • carbon dioxide diffuses in • to air spaces in leaves / into cells • for photosynthesis / produces glucose • oxygen diffuses in • for respiration 	(6)
Level I	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited explanation that gives information about active transport OR diffusion in the correct context e.g. minerals ions are transported into root (hair cells) • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	<ul style="list-style-type: none"> • a simple explanation that gives details of active transport or diffusion transporting materials e.g. carbon dioxide diffuses into leaves down their concentration gradient OR a limited explanation of both active transport and diffusion • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5 - 6	<ul style="list-style-type: none"> • a detailed explanation that describes both processes e.g. active transport requires energy to transport mineral ions into the root hair cell AND carbon dioxide diffuses into the leaf for photosynthesis • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

(Total for question 3 = 12 marks)